Cottle Zero Net Energy Home, San Jose (Credit: DOE)

nbi new buildings institute

Reach Code for Residential New Construction

June 25, 2019

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

CLIMATE SMART SAN JOSE
LIVING BETTER TODAY FOR TOMORROW

Agenda

- Introductions
- Why San José is Pursuing a Reach Code
- Reach Code Development Process
- Stakeholder Feedback for Reach Code Options
  - Electrification
  - Electric Vehicle Charging Infrastructure
  - Solar

nbi new buildings institute

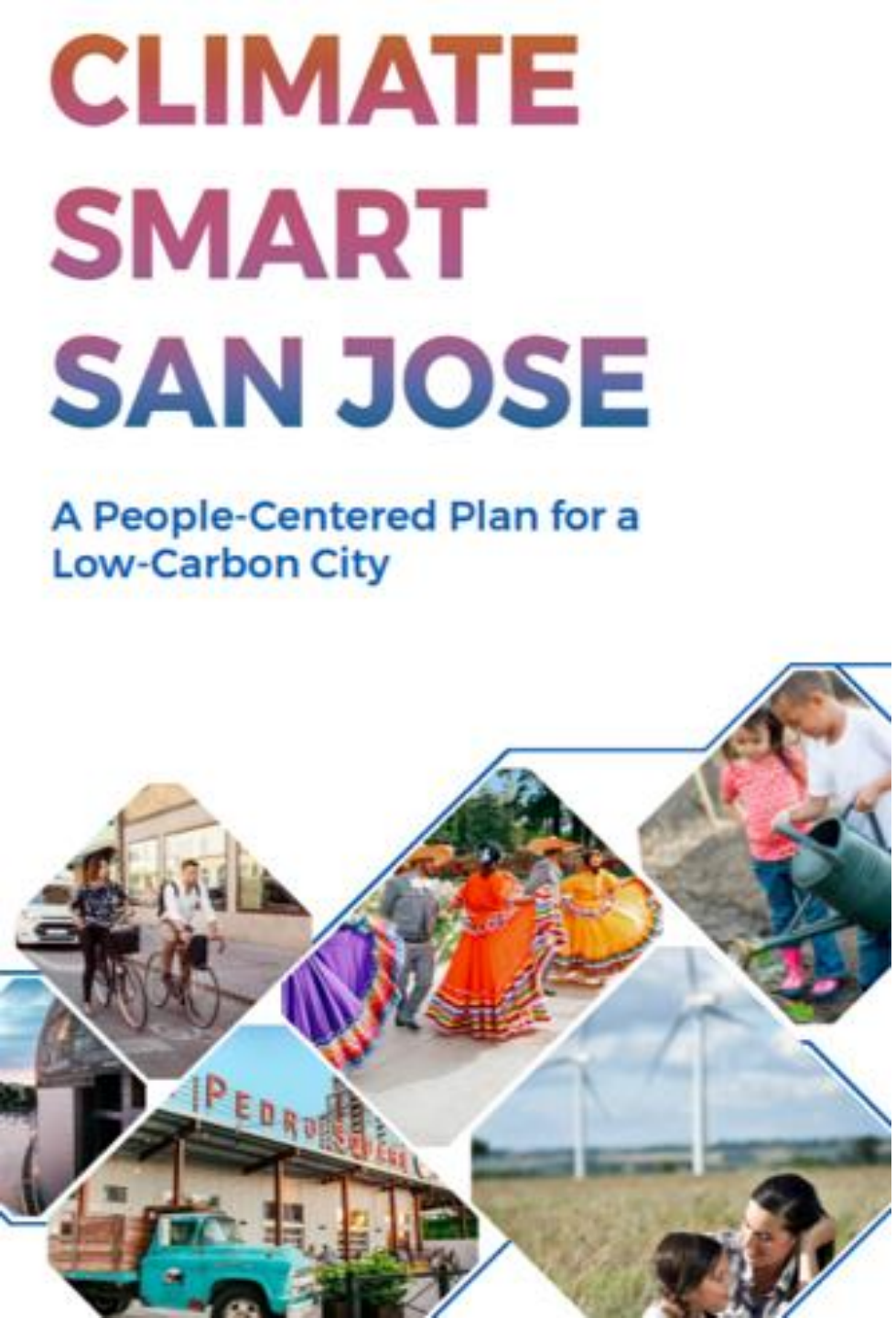
CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

CLIMATE SMART
SAN JOSE
LIVING BETTER TODAY FOR TOMORROW

nbi new buildings institute

nbi new buildings institute

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY



Why is San José Pursuing a Reach Code?

- GHG Reductions = Good!
- The Good Life 2.0
- Aligns with Climate Smart 2030 goals:
  - 47% of homes are all-electric
  - 37,975 zero net carbon (ZNC) homes
  - 70M sq. ft. of ZNC commercial buildings
  - 61% of all passenger vehicles are electric
  - 668 MW of solar installed

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Avoided GHG emissions are significant

Benefits to community

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

San José Context

All-Electric Buildings



Solar

EVs and Charging Infrastructure

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

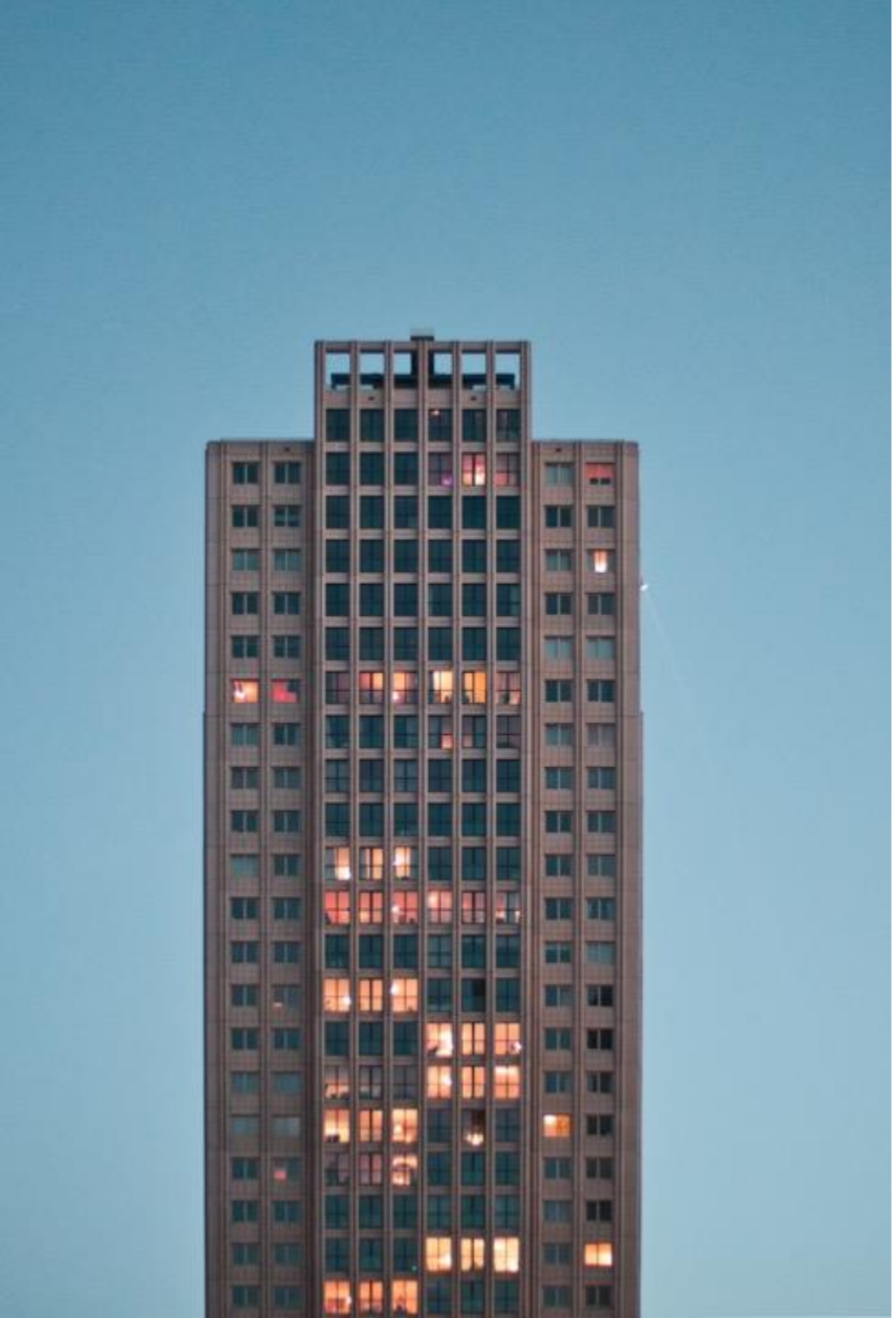
San José Context – Carbon Impact of Growth

Building Type	Sq. Ft.	CO2/ Yr.		Units/ Yr.		Years in Service		Years in Code Cycle		Total CO2
Single- Family	2,700	2 tons	X	350	X	50	X	3	=	**105,000 tons**
Multi-Family	1,000	1 ton	X	2400	X	50	X	3	=	**360,000 tons**
Commercial/ Industrial	100,000	120 tons	X	24	X	50	X	3	=	**432,000 tons**
										1.7 trillion car miles

Courtesy TRC, Peninsula Clean Energy (PCE) & Silicon Valley Clean Energy (SVCE)

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY



San José
Reach Code Development

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Minimum Base Codes

Set minimum levels of efficiency for building design and construction

nbi new buildings institute

What is a Reach Code?

- Overlays the base code
- Includes additional requirements, such as:
  - Energy efficiency
  - Water efficiency
  - Renewable energy
  - EV charging infrastructure
  - Electrification

nbi new buildings institute

What is a Reach Code?

- Overlays the base code
- Includes additional requirements, such as:
  - Building Electrification
  - Electric Vehicle Charing Infrastructure
  - Solar PV

nbi new buildings institute

City		Measures
Alameda County	2018	Solar PV
City of Brisbane	2017	Cool Roof, Solar PV
City of Chula Vista	2018	Outdoor Lighting
City of Del Mar	2018	Energy Efficiency
City of Davis	2017	Energy Efficiency, Solar PV
City of Fremont	2017	Lighting, Solar PV
City of Healdsburg	2017	Energy Efficiency
City of Lancaster	2018	Solar PV
Marin County	2017/8	Energy Efficiency
Mill Valley	2017	Energy Efficiency
City of Novato	2017	Energy Efficiency
City of Palo Alto	2016	Energy Efficiency, Solar PV, EV
Town of Portola Valley	2017	Energy Efficiency
City of San Francisco	2016	Solar PV or Solar Thermal
City of San Mateo	2016	Cool Roofs, Solar

Courtesy TRC, PCE & SVCE

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

City		Measures
Alameda County	2018	Solar PV
City of Brisbane	2017	Cool Roof, Solar PV
City of Chula Vista	2018	Outdoor Lighting
City of Del Mar	2018	Energy Efficiency
City of Davis	2017	Energy Efficiency, Solar PV
City of Fremont	2017	Lighting, Solar PV
City of Healdsburg	2017	Energy Efficiency
City of Lancaster	2018	Solar PV
Marin County	2017/8	Energy Efficiency
Mill Valley	2017	Energy Efficiency
City of Novato	2017	Energy Efficiency
City of Palo Alto	2016	Energy Efficiency, Solar PV, EV
Town of Portola Valley	2017	Energy Efficiency
City of San Francisco	2016	Solar PV or Solar Thermal
City of San Mateo	2016	Cool Roofs, Solar

Over 40 communities are considering reach codes

Courtesy TRC, PCE & SVCE

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Reach Code Regional Effort

NRDC
NATURAL RESOURCES DEFENSE COUNCIL

PENINSULA CLEAN ENERGY

DNV·GL

BUILDING DECARBONIZATION COALITION

EAST BAY COMMUNITY ENERGY

TRC
Results you can rely on

BAYREN

SILICON VALLEY CLEAN ENERGY

nbi new buildings institute

nbi new buildings institute
CAPITAL OF SILICON VALLEY

CALIFORNIA ENERGY CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

Title 24, Parts 6 and 11
Local Energy Efficiency Ordinances

Cost-effectiveness Study: Low-Rise Residential

CALIFORNIA ENERGY CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

Title 24, Parts 6 and 11
Local Energy Efficiency Ordinances

Cost-effectiveness Study: Low-Rise Residential

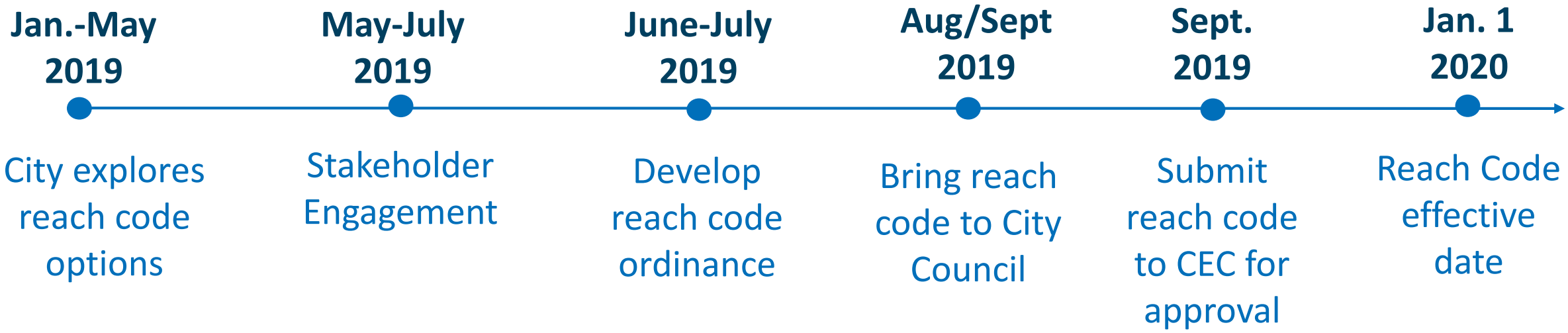
Prepared for:
Kelly Cunningham
Codes and Standards Program
Pacific Gas and Electric Company

Prepared by:
Frontier Energy, Inc.
Misti Bruceri & Associates, LLC

Last Modified: March 15, 2019

nbi new buildings institute

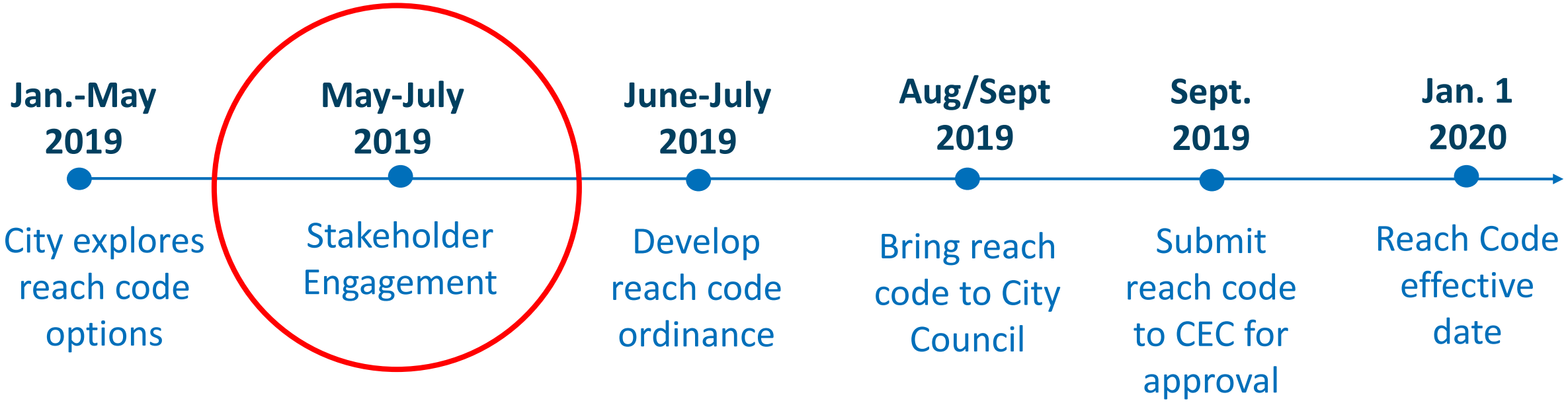
San José Reach Code Development Process & Timeline



nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

San José Reach Code Development Process & Timeline



nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

San José Reach Code Stakeholder Meetings

Initial Feedback

Non-Residential

Residential

Final Input

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

Discussion and Feedback

Objective: Further building electrification, EVCI and Solar PV installation for new commercial construction in San José

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

What's already included in the 2019 Building Code?

Residential:

- Prewiring of all homes for future electric heat water heater
- Solar PV sized to cover all non-HVAC equipment
- Use the Energy Design Rating (EDR) for all energy models
- 1 "EV Ready" parking space for attached garages

Reach Code Options

- Building Electrification
- Electric Vehicle Charging Infrastructure
- Solar PV

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

Building Electrification

All-Electric

- Compliance margin of 0% above Title 24 requirements.

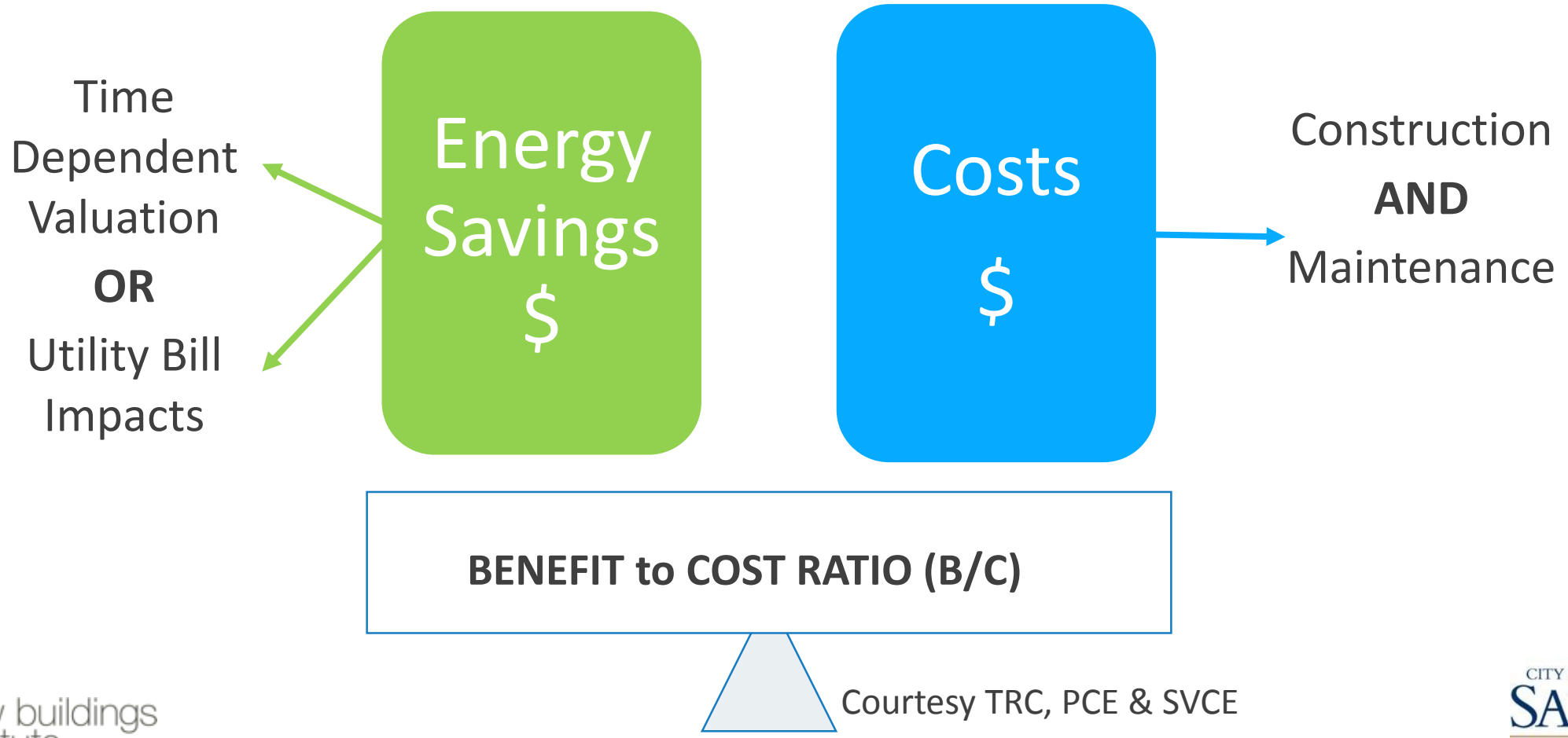
Mixed Fuel

- Include wiring and breakers for electric water heating, furnace, cooking and clothes drying
- Compliance margin of up to 25% above Title 24 requirements.

Cost of All Electric

Home Type	Incremental First Cost	Annual Energy Cost Impact	Lifecycle Cost Impact
Single-Family Home	-$5,349/unit	+$224	-$11,872
Low-Rise Multifamily Dwelling Unit	-$2,337/unit	+$83	-$5,899

Determining Cost Effectiveness



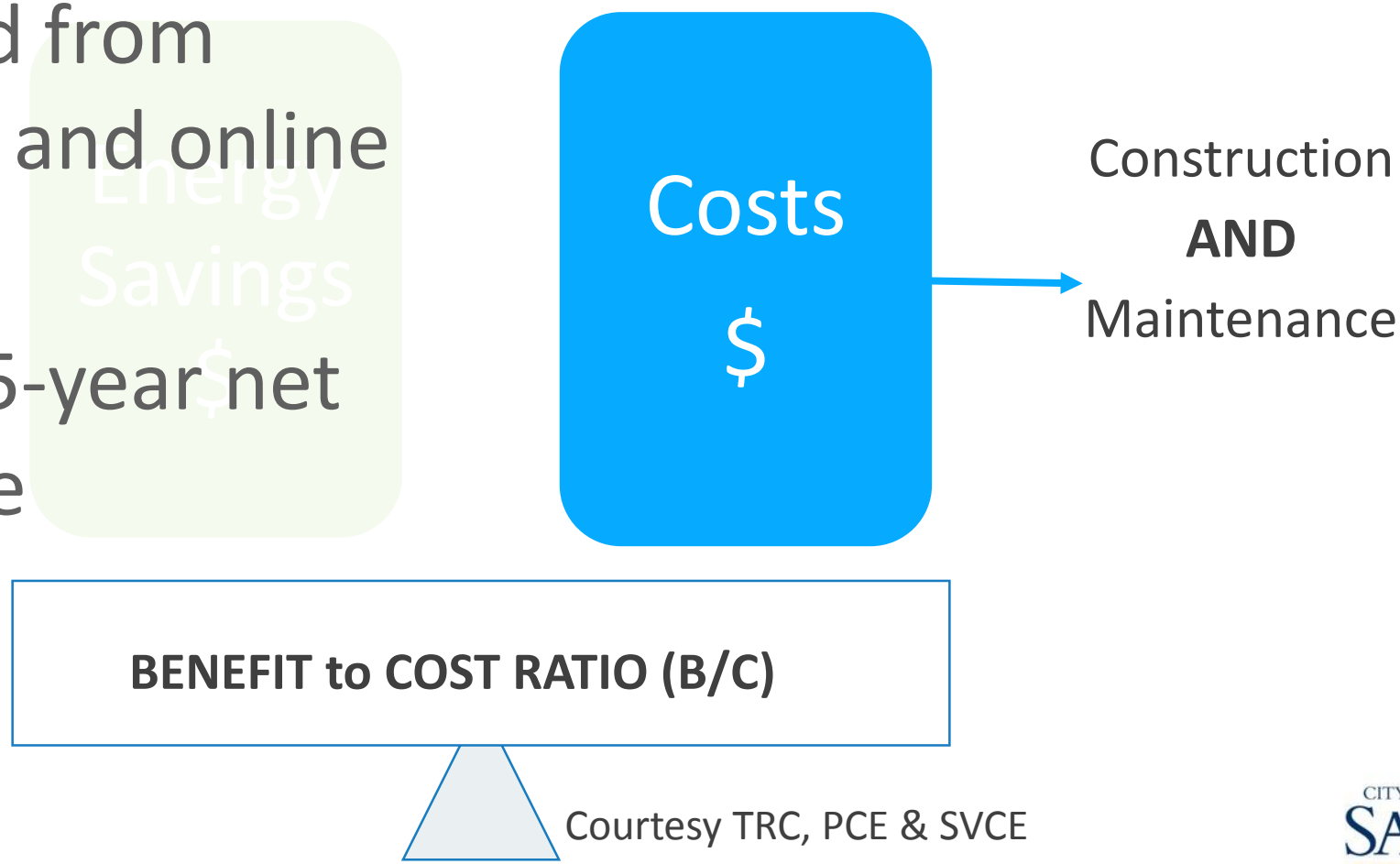
Courtesy TRC, PCE & SVCE

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

Determining Cost Effectiveness

- Costs derived from local experts and online resources
- 30-year or 15-year net present value



Reach Code Options

Electric Vehicle Charging Infrastructure

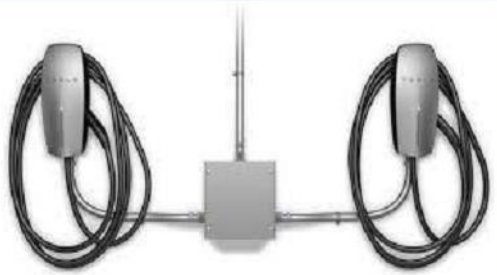
- Building Electrification
- **Electric Vehicle Charging Infrastructure**
- Solar PV

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

EVCI Definitions

Electric Vehicle Charging Infrastructure

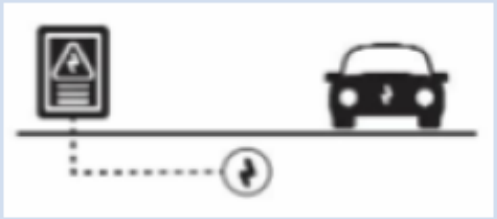
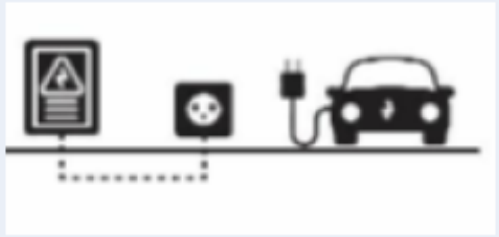
Level 1		15-20 Amp, 120v AC (standard household outlet) Driving Distance provided: 3-4 miles/hour
Level 2		40+ Amp, 208/240v AC Driving Distance provided: 25-30 miles/hour
DC Fast Charge		80-400 Amp, 200-600v DC Driving Distance provided: 125-1000 miles/hour

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

EVCI Definitions

Electric Vehicle Charging Infrastructure

EV Capable *(Some assembly required)*		Raceway (conduit), electrical capacity (breaker space)
EV Ready *(Plug & Play)*		Raceway (conduit), electrical service capacity, overcurrent protection devices, wire and outlet (i.e. full circuit)
EV Supply Equipment (EVSE) Installed *(Level 2 Charge!)*		All the equipment needed to deliver electrical energy from an electricity source to the EV

Courtesy TRC, PCE & SVCE

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

Electric Vehicle Charging Infrastructure

Residential: EVCI Reach Code Options

Single Family:

- Increase # of EV Capable spaces

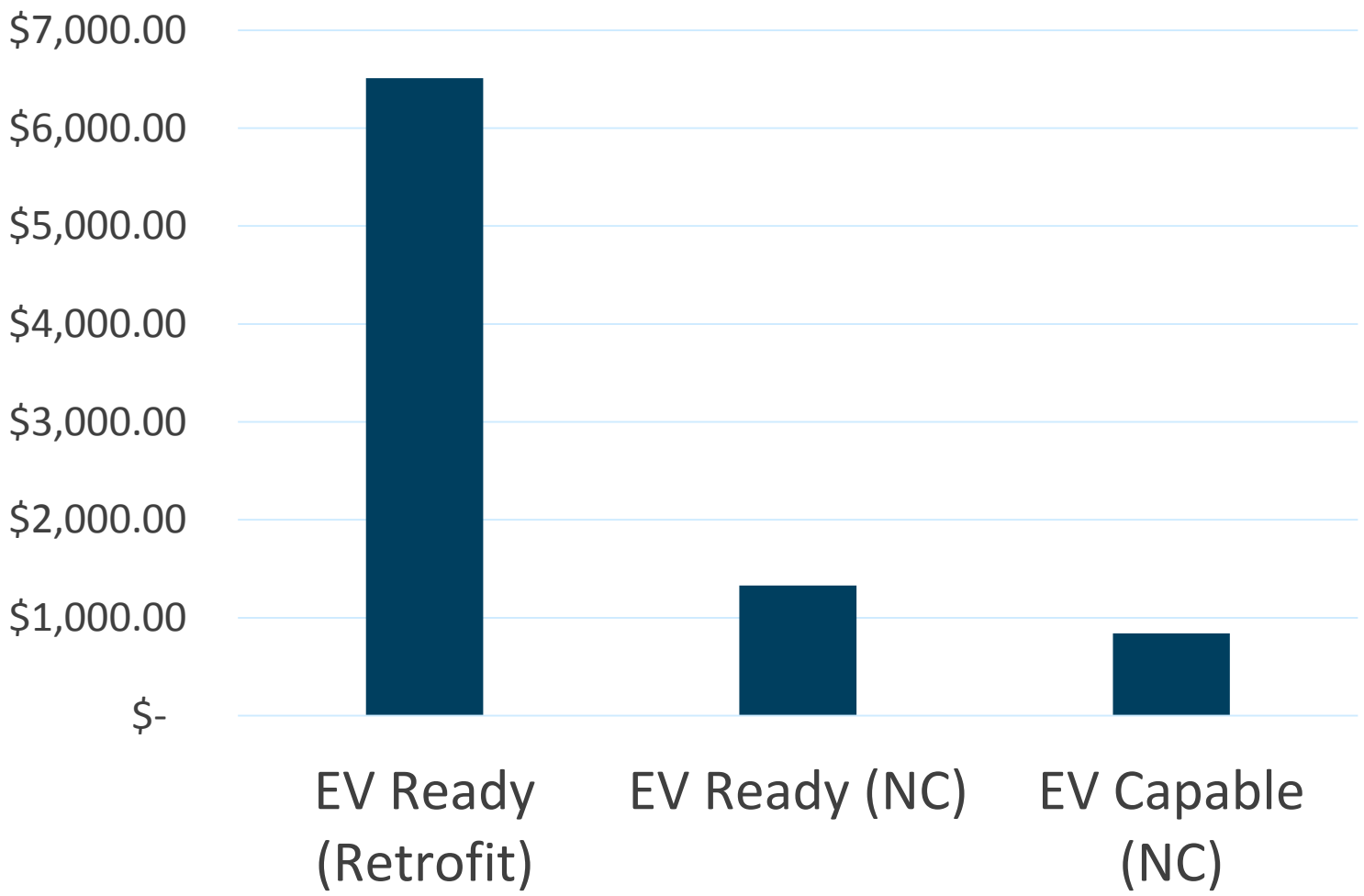
Multi-family (under 3 stories):

- Find right targets for EV Capable, EV Ready and EVSE spaces

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

EVCI – Cost of New vs. Retrofit

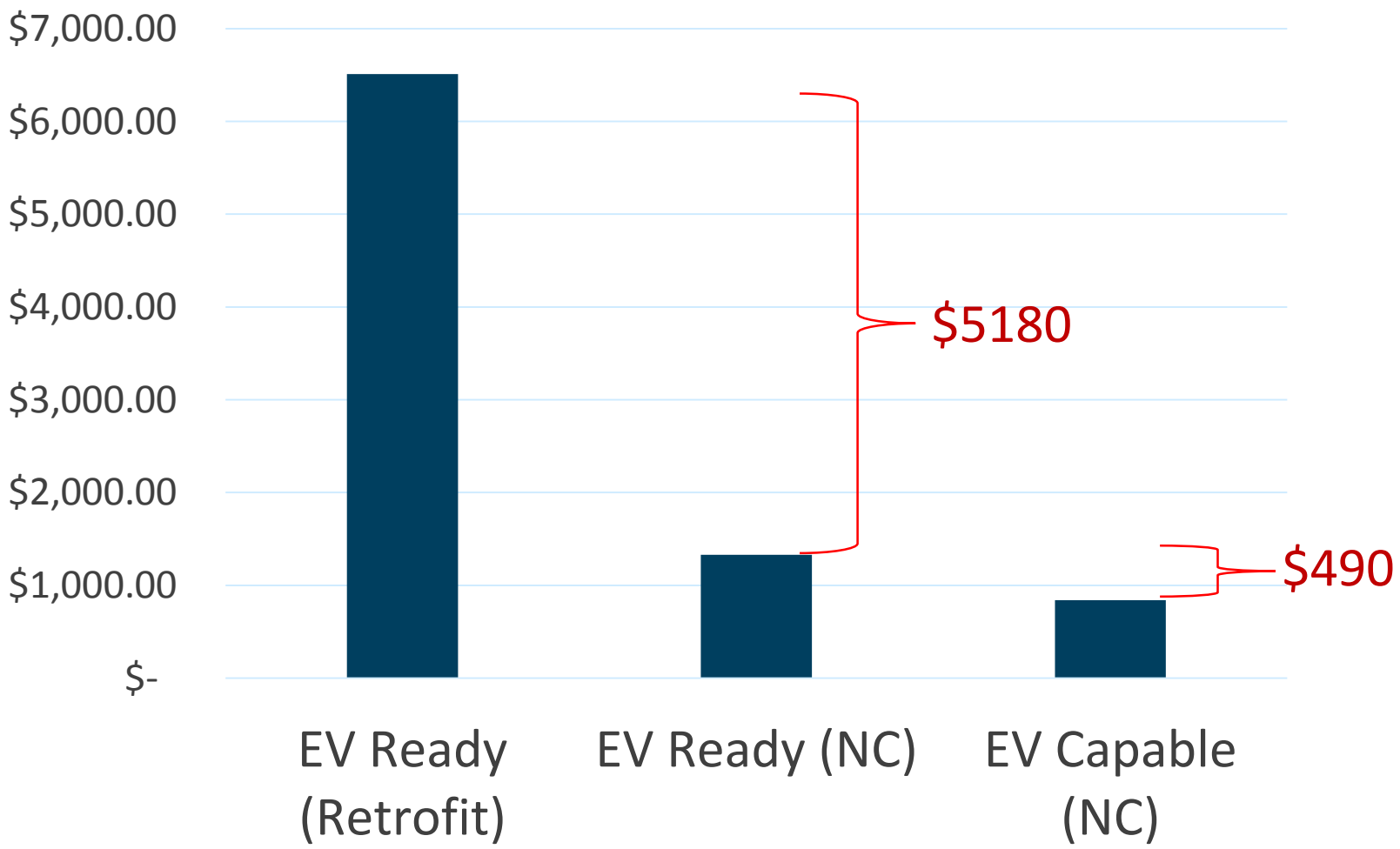
Electric Vehicle Charging Infrastructure



"Driving Plug-In Electric Vehicle Adoption with Green Building Codes" by Energy Solutions, PG&E, ARB.
(Graphic courtesy TRC, PSE & SVCE)

EVCI – Cost of New vs. Retrofit

Electric Vehicle Charging Infrastructure



"Driving Plug-In Electric Vehicle Adoption with Green Building Codes" by Energy Solutions, PG&E, ARB.
(Graphic courtesy TRC, PSE & SVCE)

CLIMATE SMART SAN JOSE

A People-Centered Plan for a Low-Carbon City

Solar

- Building Electrification
- Electric Vehicle Charging Infrastructure
- Solar PV

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Residential:
Solar Reach Code Options

- Promote PV with increased efficiency for mixed fuel homes
- Require PV
  - To meet code
  - In addition to code

Next Steps

Upcoming Stakeholder Meetings:

- July 10 – Final Reach Code Input

Contact Information:

- energy@sanjoseca.gov
- City Reach Code Webpage: www.sjenvironment.org/reachcode

nbi new buildings institute

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY